injury, $n = 02$ cases (9%); head injury, $n = 01$ case (5%); multiple sclerosis, $n = 01$ cases (5%) and sequelae of meningitis, $n = 01$ case (5%). The affected lower limb spasticity, $n = 17$ cases (77.2%); upper limb, $n = 09$ cases (49.9%). Stretching casts were placed 10 to 15 days after injection in 07 patients (31.8%).

Discussion/conclusion.– Intramuscular injections of botulinum toxin showed a gain of the modified Ashworth score of about 02 points on average after 02 to 04 weeks, a gain of joint mobility, improved terms orthopedic and functional. After 03 months the results were classified into three levels; good: $n = 09$ patients (40.9%), medium: $n = 07$ patients (31.8%) and poor: $n = 06$ (27.2%).

Further readings

1. J. Pelissier, G. Asencio, M. Julia. Foot of the hemiplegic COFEM; 2007.
2. Bean A. Spasticity and botulinum toxin. Neurosurgery May 2003;49(2–3):p. 265–70.

doi:10.1016/j.rehab.2011.07.605

P022–EN

Effect of botulinum toxin injection on spatiotemporal parameters of gait in adults with cerebral palsy

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Keywords: CP; Gait; Biomechanics; Botulinum toxin

Objective.– The quantification of the degradation of gait quality and of the autonomy is a major part of the medical care for patients with a spastic diplegia due to cerebral palsy (CP). In children with CP, many studies have characterized gait pattern. From these works, many indexes have been proposed. Currently, the Gillette Gait Index (GGI) is the score preferred by clinicians to follow gait modifications and the effects of therapeutics. The purpose of this study was to evaluate the effect of botulinum toxin (BoNTA) injections on the spatiotemporal parameters of gait and on GGI of adult CP patients.

Method.– Sixteen patients (28 ± 7 years) participated in this study. A quantitative gait analysis at the preferred speed (Helen Hayes protocol, 100 Hz Motion Analysis ®) was performed before and 1 month after multi area injection of BoNTA. Data analysis was performed on the spatiotemporal parameters of the gait cycle, on the asymmetry of the gait cycle phase (Robinson index) and the GGI was calculated. A student t-test was performed ($P < 0.05$).

Results.– Post-BoNTA injection, the gait velocity and the step length of patients significantly increased (respectively, +10% and +6%) and the asymmetry index during the stance phase and the swing phase significantly decreased (respectively, −3.37 and −6.2). The mean GGI was of 294 [88–641] for the right side and of 956 [618–1572] for the left side. Post-BoNTA, we can note an improvement of the GGI for 3 patients out of 16, an alteration for 4 patients and no changes for the 9 other patients (test proposed by Postans).

Discussion.– The results of this study showed that the BoNTA injection induced an improvement of several gait parameters, such as the gait velocity and the asymmetry during the stance and the swing phase. However, post-BoNTA injection the evolution of the GGI was very heterogeneous. This result could be explained by the fact that the GGI is calculated thanks to several kinematics parameters which have not changed in the same direction and/or in the same proportion for each patient.

doi:10.1016/j.rehab.2011.07.606

P023–EN

Interest of balance training and physical conditioning in outpatient management of ataxic neuropathy: Case report and review of the literature

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Keywords: Ataxic neuropathy; Balance; Rehabilitation

by impairment of deep sensation and moderate motor impairment. They lead to instability with impaired balance and gait. The specific functional rehabilitation is a major asset in the care of these patients

Observation.– A 28-year-old patient presents an ataxic progressive neuropathy (since the age of 6 years). It is complicated by a Charcot foot which was treated surgically with amputation of the 1st, 2nd and 3rd left toe. This patient presented difficulties in his social and occupation life (impaired balance and gait, difficulty in climbing stairs. . .). A review: walking heels, bilateral flat valgus feet and disturbed of proprioceptive and thermoalgesic sensorial perception. Assessment was based on the evaluation of balance (single leg stance, Berg Balance scale and get up and go test) and gait speed. A specific rehabilitation treatment was undertaken in an outpatient clinic for improving the stability and balance, postural correction, improving the pattern and speed of walking and physical conditioning. A molded orthotics was prescribed. Outcome was marked by an improvement in all parameters evaluated after two months of rehabilitation. The patient felt very satisfied.

Discussion.– Rehabilitation in ataxic neuropathy is based on sensorial rehabilitation, range of motion gain, muscle strengthening, static and dynamic rehabilitation and improving aerobic capacity. Devices are necessary particularly in cases of neurological arthropathy of the feet. These patients should be referred routinely to rehabilitation units for early care, which allow improvement of their social and occupational quality of life.

Further reading

Ruhland JL, Shields RK. The effects of a home exercise program on impairment and health-related quality of life in persons with chronic peripheral neuropathies. Phys Ther 1997;77:1026–39.

doi:10.1016/j.rehab.2011.07.607

P024–EN

Simulated cerebral palsy gait patterns: The effects on joint and muscle activities

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Keywords: Simulated gait; Cerebral Palsy; Joint and muscle activities

Cerebral palsy (CP) is a neurological disorder producing motor impairments of the lower limbs. Comparing gait analysis data, representative of the motor disorganization, with data from the healthy population might change clinical interpretations of primary neurological consequences and secondary and compensatory effects resulting in muscle abnormalities and bone growth disorders. In a perspective to improve appropriate treatment in the management of CP, this study proposes to evaluate the direct consequences of mimicking pathological postures on the kinetics and EMG signals to give an explanation of the differences observed between the specific CP primary consequences and those caused by biomechanical constraints on joints.

Ten healthy adults were asked to perform a normal walk test and to mimic gaits observed in cerebral palsy (CP) patients with spastic diplegia, jump and crouch gaits. The capture movement was performed using a Vicon system with 13 cameras and 2 force plates. Anatomical landmarks were placed according to the protocol of Hélène Hayes and 8 EMG electrodes were placed at principal muscles of the lower limbs. Spatiotemporal parameters, kinematics, kinetics and EMG were compared to normal gait and to CP gaits.

Results shows that simulated pathological gaits produced changes in gait parameters, kinetics and muscle activations, similar to those observed with CP patients. As results, the velocity, stride length the cadence and also the range of motion decreased significantly for all simulated gaits, as the complexity of the gait pattern increased. Abnormalities were found in electromyographic activity and joint moments. Compared with a normal EMG pattern, premature activities and prolonged activities were detected.

Significant deviations from normal gait were the results of biomechanical constraints and abnormal joint positions associated with the pathological patterns. This study may validate the proposition that the abnormal muscle responses are the consequences of biomechanical restrictions at joints rather than central nervous system impairments. This finding may help clinicians to better appreciate the effectiveness of surgical intervention in the management of CP.

Acknowledgments
This project is supported by the Region Picardie.

doi:10.1016/j.rehab.2011.07.608

P025–EN

Brain plasticity and late acquisition of prosthetic gait: Data of functional MRI and gait analysis of a patient with congenital lower limbs atrophy. Preliminary results

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Keywords: Brain plasticity; Functional MRI; Congenital limb atrophy; Femoral amputation

Introduction.– In France, the number of amputees is estimated at 0.6 for every 100 inhabitants, with a very low proportion of congenital amputations (less than 0.35 for every 100,000 births). Very few patients reach adulthood without having received rehabilitation care or using prosthesis.

Study

Objectives.– First, describe the modifications of the cortical representation with functional MRI (fMRI) during gait learning with prosthesis of a patient with congenital lower limb atrophy, then correlate these modifications with kinetic and kinematic parameters of gait analysis.

Patient.– A 17-year-old African girl, with congenital lower limb atrophy underwent a double distal trans-femoral amputation at 15 years old. Without any rehabilitation or prosthesis, she moved indoors on her two stumps or with a manual wheelchair.

Materials and methods.– FMRI and gait analysis before prosthesis and 2, 4 and 6 months after.

Discussion.– Brain plasticity corresponds to the modifications of cortical activation of the cerebral regions during learning, and can be evaluated by successive fMRI. Brain plasticity and its partial reversibility are well studied in traumatic amputees [1–2]. However, no study of functional imaging concerning patients with congenital limb atrophy has been found. For our patient, which initial cartography of cerebral activated areas will be found, compared to a healthy person one? What will be the structural and functional modifications of this cortical organization during gait learning (2, 4 and 6 months after the beginning of prosthetic gait)? This study with fMRI will be correlated to kinetic and kinematic parameters of gait analysis in order to evaluate her gait abnormalities, learning and improvements.

Conclusion.– No study of brain plasticity during the late acquisition of prosthetic gait has been found in literature. Preliminary results of this study will be presented.

References

[1] Ramachandran VS et al. Perceptual correlates of massive cortical reorganization. Science 1992;258:1159–60.
[2] Giraux P, Sirigu A. Des mains à la reconquête du cerveau. Les dossiers de la recherche 2010;40:56–9.

doi:10.1016/j.rehab.2011.07.609

P026–EN

Quinine and spasms: How effective?

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Keywords: Spasms; Quinine

Introduction.– Spasms are common in neurological patients (multiple sclerosis, spinal cord injury. . .); our case study aims to report the effectiveness of quinine taken at very low doses based on a chance observation of improvement after ingestion of soda with traces of quinine.

Patients and methods.– After excluding contraindications for taking quinine, we invited 8 patients with neurological spasms and significant spasticity to drink a daily 330 mL soft drink with quinine at low doses. Response was evaluated after 10 days with the Penn spasm scale.

Results.– All eight patients had a score of 3 on the scale of Penn at the beginning, with 5 multiple sclerosis, and 3 spinal cord injuries. This gave an improvement in 6 cases (75%) of the order of at least one score, and score improvement from 3 to 1 on the scale of Penn in two cases (25%).

Discussion and conclusion.– The treatment of spasm by low-dose quinine has been controversial in the literature, however, in our series we found a satisfactory improvement. A prospective, randomized, double-blind trial would be warranted.

doi:10.1016/j.rehab.2011.07.610

P027–EN

Delayed recovery of prehension after stroke: A clinical and kinematic analysis

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Keywords: Stroke; Motor recovery; Kinematics; Prehension

Introduction.– Motor function recovery of the upper limb after stroke remains very limited with the persistence of an impaired grip in about 80% of the cases. This recovery is not linear, and occurs in two phases: an initial phase of rapid recovery during the first 3 months followed by a slower phase, which tends to a plateau. We describe a patient who had delayed distal motor recovery in the upper limb 9 years after stroke.

Case report.– A 53-year-old man had an ischemic stroke in 2001 with right hemiplegia. After 5 months, he presented a discreet proximal motor recovery of the upper limb and 4 years later, he had a beginning of a non functional thumb-index pinch. In 2010, all types of grip were possible with a Fugl Meyer score of 56/66. The strength of the right palm was assessed at 70% in comparison to the healthy side, and the Box and Block test dexterity at 50%. Kinematic analysis conducted in 2010 showed, comparatively with the previous one performed in 2006, a decrease of movement time ($P < 0.01$) with increasing time of peak velocity ($P < 0.01$) and a hand opening earlier and more compared with healthy controls ($P < 0.01$). There was also a significant difference in movement time ($P < 0.05$) for the power and the precision grip.

Discussion.– This is a case of delayed motor recovery of the upper limb after stroke with recovery of a precision grip after 9 years evolution. The kinematic analysis showed a movement initially variable but whose variability decreasing with time. The profile of hand opening had evolved from sliding the fingers over the object, towards a more suitable grip comparable with control subjects. Even in the absence of early recovery, functional distal motor recovery of the upper limb can occur at distance of stroke. Kinematics analysis is an interesting tool to assess the improvement of distal motor recovery in the upper limb after stroke.

doi:10.1016/j.rehab.2011.07.611